

Staff Report

State Water Resources Control Board

2014 and 2016 California Integrated Report
Clean Water Act Sections 303(d) and 305(b)

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STATE OF CALIFORNIA

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EXECUTIVE SUMMARY

The goal of the Clean Water Act (CWA) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 U.S.C § 1251(a)). Pursuant to Clean Water Act sections 303(d) and 305(b) (33 U.S.C. §§ 1313(d), 1315(b)), each state is required to report to the U.S. Environmental Protection Agency (U.S. EPA) on the overall quality of the waters of the United States within its state. The U.S. EPA then compiles these reports into their biennial "National Water Quality Inventory Report" to Congress. Under CWA section 303(d), states are required to review, make changes as necessary, and submit to U.S. EPA a list identifying waterbodies not meeting water quality standards and the water quality parameter (i.e., pollutant) not being met referred to as the "303(d) List". States are required to include a priority ranking of such waters, taking into account the severity of the pollution and the uses to be made of such waters, including waters targeted for the development of total maximum daily loads (TMDLs). Under CWA section 305(b), each state is required to report biennially to the U.S. EPA on the water quality conditions of its surface waters referred to as the "305(b) Report". States are required to submit their 303(d) Lists and 305(b) Reports every two years (the listing cycle) (40 C.F.R. § 130.7(d)). The State Water Resources Control Board (State Water Board) administers this portion of the Clean Water Act for the State of California. The U.S. EPA issued guidance to states requiring that the 305(b) Report and the 303(d) List be integrated into a single report. For California, this report is called the "California Integrated Report" and it satisfies both the CWA section 305(b) and section 303(d) requirements.

For the 2014 and 2016 listing cycles, the reporting processes for the 303(d) List and 305(b) Report have been combined into the proposed 2014 and 2016 California Integrated Report. Only the 303(d) List portion of the proposed 2014 and 2016 California Integrated Report requires approval by the State Water Board and U.S. EPA. The 305(b) report portion of the California Integrated Report requires no approval by the State Water Board or U.S. EPA. The proposed 2014 and 2016 California Integrated Report is a compilation of the data and information submitted for the Regional Water Quality Control Boards (Regional Water Boards) for the San Francisco Bay (Region 2), Central Coast (Region 3), Los Angeles (Region 4), Central Valley (Region 5), Santa Ana (Region 8), and San Diego (Region 9) regions. After approval of the 303(d) list by the State Water Board, the complete California Integrated Report will be submitted to U.S. EPA, which may make changes to the 303(d) list portion of the California Integrated Report before it approves the final California 303(d) List.

The 2014 and 2016 California Integrated Report provides the recommendations of Water Board staff for changes to the 2012 California Integrated Report. The State Water Board evaluated the waterbody fact sheets for completeness, consistency with the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy), and consistency with applicable law. In accordance with the requirements contained in Section 6.2 of the listing policy, regions 2, 3, 5, 8, and 9 approved their respective regional 303(d) List recommendations and submitted them to the State Water Board. Region 4 conducted a complete public participation process but did not approve its Regional 303(d) List recommendations. The State Water Board is administrating the listing process for Region 4 consistent with Section 6.2 of the Listing Policy. The fact sheets and associated lines of evidence specific to the Los Angeles Region are compiled in Appendix H. The State Water Board assembled the fact sheets and consolidated the six Regional Water Board 303(d) lists into the statewide proposed 303(d) list. The proposed 303(d) list and the 305(b) report was compiled into this 2014 and 2016 California Integrated Report.

This Staff Report provides the following information and overview of the approach utilized to develop the 2014 and 2016 California Integrated Report:

- a. Data sources used,
- b. Objectives, criteria, and evaluation guidelines against which data were compared,
- c. Methodology for assessing the attainment of water quality standards and identifying 303(d) listings,
- d. Methodology used to categorize waterbody segments according to beneficial use support for the 305(b) report, and
- e. State Water Board recommendations for the 303(d) list portion of the 2014 and 2016 California Integrated Report.

Waterbody assessments are detailed in the appendices. Appendices A through G provide assessments of waterbodies in each California Integrated Report category based on beneficial use support. Appendix I presents all the fact sheets and supporting documentation for each waterbody-pollutant combination in the 2014 and 2016 California Integrated Report. These fact sheets include a listing recommendation and at least one Line of Evidence (LOE) describing the data and information used as a basis for each proposed decision. Appendix J is the 2012 California CWA section 303(d) List of Water Quality Limited Segments. Appendix K contains the miscellaneous changes report. Appendix L provides citations for all of the references used in developing the 2014 and 2016 California Integrated Report.

Water quality data collected by internal programs and provided by outside agencies and entities during the current combined listing cycles resulted in a large quantity of information and data for assessment. A total of 23,441 new fact sheets assessing unique waterbody-pollutant combinations in Regions 2, 3, 4, 5, 8, and 9 were developed during this evaluation. These fact sheets contain 42,839 new LOEs for Regions 2, 3, 4, 5, 8, and 9 and recommended 839 new listings and 134 delistings for Regions 2, 3, 4, 5, 8, and 9. Of the new listings and delistings, the State Water Board revised Regional Water Board recommendations to remove 1 new listing, add 7 new listings, change 8 delistings back to listings, and add 1 new delisting. With State Water Board revisions and additions, 995 new listings and 184 new delistings in Regions 2, 3, 4, 5, 8, and 9 are recommended to be added to or removed from the to the 2012 303(d) List, for a total of 4,395 waterbody-pollutant combination listings statewide on the proposed 2014 and 2016 303(d) List. Table 1 shows a summary of the State Water Board recommendations for the 2014 and 2016 section 303(d) List.

Table 1 Summary of State Water Board Recommendations for waterbody-pollutant combinations being added or removed from the 2012 303(d) List

| Region | 2012 303(d) List (Categories 4a, 4b and 5) | 2014 and 2016 303(d) List | | | | Total 303(d) Listings (Categories 4a, 4b and 5) |
|---------------|---|-----------------------------------|-----------------------|------------------------|--------------------------|--|
| | | State Water Board Recommendations | | Miscellaneous Changes* | | |
| | | New 303(d) Listings | New 303(d) Delistings | Resulting in Listings* | Resulting in Delistings* | |
| 1 | 185 | 0 | 0 | 0 | 0 | 185 |
| 2 | 333 | 24 | 7 | 6 | 10 | 350 |
| 3 | 712 | 275 | 47 | 0 | 24 | 940 |
| 4 | 823 | 150 | 57 | 0 | 0 | 916 |
| 5 | 730 | 273 | 45 | 0 | 0 | 958 |
| 6 | 156 | 0 | 0 | 0 | 0 | 156 |
| 7 | 68 | 0 | 0 | 0 | 0 | 68 |
| 8 | 132 | 28 | 12 | 0 | 0 | 148 |
| 9 | 445 | 245 | 16 | 1 | 0 | 674 |
| TOTALS | 3,584 | 995 | 184 | 7 | 34 | 4,395 |

* Miscellaneous changes resulted in additional listings and delistings created from mapping changes such as the splitting of a waterbody into additional segments or the merging of waterbodies into one single waterbody. Original 303(d) listings are copied from old segments to new segments and then delisted from the old segment. This generates more listings and delistings that should not be included in important counts of 2014 and 2016 new listings and delistings.

For the 305(b) report, those waterbodies that were assessed were placed into one of U.S. EPA's recommended five Integrated Report beneficial use support related categories. The placement of a waterbody into the appropriate Integrated Report category was based on the assessment of the available water quality data. The most common core beneficial uses evaluated are aquatic life, drinking water supply, human consumption of fish, non-contact water recreation, shell fish harvesting, and water contact recreation. Table 2 shows the 2014 and 2016 California Integrated Report categories and the number of waterbodies in each category.

The proposed statewide 303(d) list portion of the 2014 and 2016 California Integrated Report consists of waterbody-pollutant combinations in Categories 4a, 4b, and 5. U.S. EPA considers only waterbody-pollutant combinations in Category 5 to be responsive to the reporting requirement of CWA section 303(d).

Table 2 Integrated Report Category Summary and Waterbody Count

| Category | Description | Waterbodies |
|-----------------|--|--------------------|
| 1 | At least one core beneficial use is supported and none are known to be impaired. | 448 |
| 2 | Insufficient information to determine beneficial use support. | 782 |
| 3 | There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened. | 24 |
| 4 | At least one beneficial use is not supported but a TMDL is not needed. | 259(Total) |
| 4a | A TMDL has been developed and approved by U.S. EPA for any waterbody-pollutant combination, and the approved implementation plan is expected to result in full attainment of the water quality standard within a reasonable, specified time frame. | 212 |
| 4b | Another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified time frame. | 46 |
| 4c | The non-attainment of any applicable water quality standard for the waterbody segment is the result of pollution and is not caused by a pollutant. | 3 |
| 5 | At least one beneficial use is not supported and a TMDL is needed. | 1,108 |
| Total | | 2,621 |

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List of Abbreviations

| | |
|----------------|--|
| Basin Plan | Regional Water Quality Control Plan |
| BPTCP | Bay Protection and Toxic Cleanup Program |
| BMI | Benthic Macro Invertebrates |
| Cal/EPA | California Environmental Protection Agency |
| CalWQA | California Water Quality Assessment (database) |
| CCAMP | Central Coast Ambient Monitoring Program |
| CCC | Criteria Continuous Concentration |
| CCR | California Code of Regulations |
| CDF | California Department of Forestry and Fire Protection |
| CDFW | California Department of Fish and Wildlife |
| CDPH | California Department of Public Health |
| CFCP | Coastal Fish Contamination Program |
| CFR | Code of Federal Regulations |
| CMC | Criteria Maximum Concentration |
| CSTF | Contaminated Sediment Task Force |
| CTR | California Toxics Rule |
| CWA | Clean Water Act |
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| FED | Functional Equivalent Document |
| DDE | Dichlorodiphenyldichloroethylene |
| DDT | Dichlorodiphenyltrichloroethane |
| DFG | Department of Fish and Game (see CDFW) |
| DO | Dissolved oxygen |
| dw | dry weight |
| EDL | Elevated Data Level |
| ERM | Effects Range Median |
| FCG | Fish Contaminant Goals |
| HCH | Hexachlorocyclohexane |
| HSA | Hydrologic Sub Area |
| HU | Hydrologic Unit |
| IBI | Index of Biological Integrity |
| ILRP | Irrigated Lands Regulatory Program |
| IR | Integrated Report |
| kg | kilogram(s) |
| Listing Policy | Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List |
| LOE(s) | Line of Evidence(s) |
| MCL | Maximum Contaminant Level |
| MDL | Method Detection Limit |
| mg/kg | milligrams per kilogram (parts per million) |
| mg/L | milligrams per liter (parts per million) |
| µg/g | micrograms per gram (parts per million) |
| µg/L | micrograms per liter (parts per billion) |

| | |
|----------|--|
| MPN | Most Probable Number |
| MTBE | Methyl tertiary-butyl ether |
| MTRL | Maximum Tissue Residue Level |
| NAS | National Academy of Sciences |
| ng/g | nanograms per gram (parts per billion) |
| ng/L | nanograms per liter (parts per trillion) |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | Nonpoint Source |
| NTU | Nephelometric Turbidity Unit |
| oc | organic carbon |
| OEHHA | Office of Environmental Health Hazard Assessment |
| PAH | Polynuclear aromatic hydrocarbon |
| PBDE | Polybrominated diphenyl ethers |
| PCB | Polychlorinated biphenyl |
| PEL | Probable Effects Level |
| pg/L | picograms per liter |
| QA | Quality Assurance |
| QAPP | Quality Assurance Project Plan |
| QC | Quality Control |
| RBI | Relative Benthic Index |
| RL | Reporting Level |
| SFEI | San Francisco Estuary Institute |
| SMWP | State Mussel Watch Program |
| SQG | Sediment Quality Guideline |
| SWAMP | Surface Water Ambient Monitoring Program |
| TDS | Total Dissolved Solids |
| TIE | Toxicity Identification Evaluation |
| TMDL | Total Maximum Daily Load |
| TSMF | Toxic Substance Monitoring Program |
| TSS | Total Suspended Solids |
| UAA | Use Attainability Analysis |
| USBR | U.S. Bureau of Reclamation |
| U.S. EPA | U.S. Environmental Protection Agency |
| USGS | U.S. Geological Survey |
| WDR | Waste Discharge Requirement |
| WQO | Water Quality Objective |
| WQS | Water Quality Standard |
| ww | wet weight |

I. Introduction

The CWA gives states the primary responsibility for protecting and restoring surface water quality. Under the CWA, states that administer the CWA must review, make necessary changes to, and submit the CWA section 303(d) List to the U.S. Environmental Protection Agency (U.S. EPA). CWA section 305(b) requires each state to report biennially to U.S. EPA, on the condition of its surface water quality. The U.S. EPA guidance to the states recommends the two reports be integrated (U.S. EPA, 2005a). For California, this "Integrated Report" is called the 2014 and 2016 California Integrated Report and combines the State Water Board's section 303(d) and 305(b) reporting requirements. The purpose of this Staff Report for the 2014 and 2016 California Integrated Report is to describe the assessment process, provide a report of surface water quality for the waterbody segments assessed as required by CWA section 305(b), and provide recommendations for additions, deletions, and changes to the 303(d) list for the 2014 and 2016 California Integrated Report.

II. Assessment Process

The water quality assessment process to comply with CWA sections 303(d) and 305(b) began with the evaluation of data collected from the surface water quality monitoring activities in California. The monitoring information is critical to understand and protect beneficial uses of water, develop water quality standards, and determine the effect of pollution and pollution prevention programs. Determining the exceedance of water quality standards, objectives, criteria, and guidelines (protective limits) forms the basis of water quality assessment for 303(d) and 305(b). Whether or not these protective limits are exceeded determines a water segment's ability to support its assigned beneficial uses and also determines whether or not the pollutant waterbody combination should be placed on the 303(d) List.

The underlying basis for the proposed statewide 303(d) List portion of the 2014 and 2016 California Integrated Report is the 2012 Section 303(d) List, which was approved by U.S. EPA on July 30, 2015. After the State Water Board proposed recommendations are approved by the State Water Board, the 2014 and 2016 Integrated Report will be submitted to U.S. EPA for final approval to become the California 2014 and 2016 Integrated Report. Regions 2, 3, 5, 8, and 9 approved their respective regional 303(d) List recommendations and submitted them to the State Water Board. Region 4 conducted a complete public participation process but did not approve its Regional 303(d) List recommendations. The State Water Board is administering the listing process for Region 4 consistent with Section 6.2 of the Listing Policy. Throughout the assessment process, the Regional Water Boards followed the requirements of the Listing Policy, which was adopted by the State Water Board on September 30, 2004, and amended on February 3, 2015.

Data and Information Used for the Assessment

State Water Board solicited public data and information from January 14, 2010, to August 30, 2010. All of the data and information submitted for Regions 2, 3, 4, 5, 8, and 9 were considered in developing the 2014 and 2016 California Integrated Report. Specifically, data and information that were reviewed included:

- a. 2012 California 303(d) List and its supporting data and information.
- b. Applicable Surface Water Ambient Monitoring Program (SWAMP) data.
- c. Irrigated Lands Regulatory Program monitoring data.
- d. Municipal Separate Storm Sewer System monitoring report data.

- e. Fish and shellfish advisories; beach postings, advisories, and closures; or other water quality based restrictions.
- f. Reports of fish kills, cancers, lesions, or tumors.
- g. U.S. EPA's Storage and Retrieval Database and other U.S. EPA databases and information sources.
- h. Southern California Coastal Water Research Project data, and the San Francisco Estuary Institute's Regional Monitoring Program data;
- i. Existing internal Water Board data and reports;
- j. Existing and readily available water quality data and information reported by local, State, and federal agencies (including receiving water monitoring data from discharger monitoring reports), citizen monitoring groups, academic institutions, and the public;
- k. Other sources of data and information that became readily available to Regional Water Board staff.

All readily available data and information (as defined by section 6.1.1 of the listing policy) in the administrative record were considered in the development of the 2014 and 2016 California Integrated Report. Water Board staff developed LOEs in the California Water Quality Assessment (CalWQA) database that summarized the available data and information, and used these LOEs to make 303(d) listing recommendations and overall beneficial use support ratings.

A. Data Processing and Analysis

This section provides a description of the process for development of LOEs, the contents of the LOEs, and the standards and evaluation guidelines used to evaluate the monitoring data.

Data Processing

Contents of the LOEs

LOEs contain specific information used to determine if water quality standards for a water segment-pollutant combination are being met. This specific information includes:

- a. Beneficial use(s) affected.
- b. Pollutant name(s) pertaining to that water segment and data.
- c. Water quality objectives (WQO) found in Basin Plans and federally promulgated water quality criteria (WQC) (e.g. the California Toxics Rule (CTR)) used to assess the data. WQOs and federally promulgated WQCs are the limits or levels of water quality constituents, which are established for the reasonable protection of beneficial uses of water.
- d. Evaluation guidelines used for interpretation of narrative objectives. Evaluation guidelines are numeric values, scientifically-based and peer reviewed, that have been determined to protect applicable beneficial uses.
- e. Detailed information specific to that data, such as type of data, the total number of samples assessed and the total number of those samples that exceeded the WQO or WQC.
- f. Spatial and temporal information that explain where and when the data were collected.
- g. References.
- h. Quality assurance (QA) information.

Fact Sheet

A decision fact sheet is composed of a recommendation and the supporting LOEs for each waterbody-pollutant combination assessed. The results of the staff analysis are presented as

recommendations in the form of fact sheets. Decision fact sheets are presented in Appendices H and I.

Analysis

Analysis begins when the pollutant sampling results, described in the LOE, are compared with the pollutant's water quality standards, criteria, objectives, and guidelines that were developed to protect water quality. Results of this comparison, in terms of numbers of exceedances and beneficial uses being evaluated in this comparison, are recorded in the LOE.

References Used in the Analysis

This section of the staff report outlines the references used by staff to identify beneficial uses of water, WQO or WQC, and, for interpretation of narrative WQCs, evaluation guidelines.

Beneficial Uses

The beneficial uses for waters of California are identified in the Regional Water Boards' Water Quality Control Plans (Basin Plans). If a beneficial use was not designated for a water segment in the Basin Plan, but it was determined that the use exists in the water segment, the water segment was assessed using the existing beneficial use of the water.

WQOs/WQCs

The water quality objectives and water quality criteria used in the assessments were from the following water quality control policies, Basin Plans, State Water Board Water Quality Control Plans, and applicable law:

- a. Basin Plans for regions 2, 3, 4, 5, 8, and 9;
- b. Statewide Water Quality Control Plans (e.g., the California Ocean Plan (2012)).
- c. California Toxics Rule (40 C.F.R. § 131.38).
- d. Bacteria standards at bathing beaches (Cal. Code Regs., tit. 17, § 7958).
- e. Maximum Contaminant Levels to the extent applicable. Examples include:
 - Table 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of the California Code of Regulations, title 22, section 64431.
 - Table 64444-A (Organic Chemicals) of the California Code of Regulations, title 22, section 64444.
 - Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of the California Code of Regulations, title 22, section 64449.

Evaluation Guidelines

Narrative water quality objectives were evaluated using "evaluation guidelines" as that term is used in the Listing Policy¹. When evaluating narrative water quality objectives or beneficial use protection, Water Board staff identified evaluation guidelines that represent standards attainment or beneficial use protection. In selecting an evaluation guideline, Water Board staff:

- a. Identified the water segment, pollutants, and beneficial uses.
- b. Identified the narrative water quality objectives or applicable water quality criteria.
- c. Identified the appropriate interpretive evaluation guideline that potentially represented water quality objective attainment or protection of beneficial uses.

Depending on the beneficial use and narrative standard, the following Listing Policy considerations were used in the selection of evaluation guidelines:

¹ State Water Resources Control Board, Water Quality Control Policy For Developing California's Clean Water Act Section 303(d) List (2015), p.19, § 6.1.3.

1. Sediment Quality Guidelines for Marine, Estuarine, and Freshwater Sediments:

Sediment quality guidelines published in peer-reviewed literature or developed by state or federal agencies were used when applicable. Acceptable guidelines included selected values (e.g., effects range-median, probable effects level, probable effects concentration), and other sediment quality guidelines. Only those sediment guidelines that are predictive of sediment toxicity were used (i.e., those guidelines that have been shown in published studies to be predictive of sediment toxicity in 50 percent or more of the samples analyzed).

2. Evaluation Guidelines for Protection from the Consumption of Fish and Shellfish:

Water Board staff selected evaluation guidelines published by U.S. EPA or Office of Environmental Health and Hazard Assessment (OEHHA). Maximum Tissue Residue Levels (MTRLs) and Elevated Data Levels (EDLs) were not used to evaluate fish or shellfish tissue data.

3. Evaluation Guidelines for Protection of Aquatic Life from Bioaccumulation of Toxic Substances:

Water Board staff selected evaluation guidelines for the protection of aquatic life published by the National Academy of Science.

B. Explanation of Specific Analyses

In this section some of the analyses conducted by Water Board staff are explained in more detail in order to allow for a better understanding of how data and information were evaluated.

Sediment Matrix Analyses

Pyrethroids, Organophosphates, Fipronil, and Fipronil Metabolites

Toxicity of pyrethroids, organophosphates, fipronil, and fipronil metabolites is dependent on the amount of organic carbon in the sediment. As a result, these pollutants are organic carbon normalized (OC-normalized) using the amount of organic carbon residing in the sediment sample. The OC-normalized result for the sample is then compared with the evaluation guideline, which was taken from peer-reviewed journal articles. The equation used for OC normalization is:

$$C_{oc} = \frac{C_{total}}{f_{oc}}$$

where,

C_{oc} = OC-normalized pesticide concentration (e.g., $\mu\text{g/g OC}$)

C_{total} = Total pesticide concentration measured (usually dry weight)

f_{oc} = the fraction of organic carbon in the sample (%OC/100)

For sample results that were reported as "non-detect" (ND), the method detection limit (MDL) was OC-normalized and compared against the evaluation guideline. In the event that the OC-normalized MDL result was above the evaluation guideline, the sample was not included in the analysis. However, if the OC-normalized MDL was below the guideline, the result was counted as a non-exceeding sample. For sample results that were reported as "detected, not quantified" (DNQ), the reporting limit (RL) was OC-normalized before being compared against the evaluation guideline. In the event that the OC-normalized RL was above the guideline, the

sample was not included in the analysis. However, if the OC-normalized RL was below the guideline, the result was counted as a non-exceeding sample.

Tissue Matrix Analyses

Composite and Individual Fish Tissue Data Treatment

Fish tissue data may have two LOEs written for the same data, one that assesses for the composite samples and another that assesses the individual fish samples that made up the composite. These LOEs were analyzed separately to make one overall listing recommendation for a given waterbody-pollutant combination. The justification for this is individual fish continually move throughout the waterbody and bioaccumulate pollutants in tissue over time. Due to the movement of fish within a waterbody, each single fish can be assessed as one sample even if they were reported as part of a composite. As a result, data in fish tissue were assessed using a situation-specific weight of evidence approach relying on the best professional judgement of Water Board staff using both the composite and individual fish analysis to make a single listing recommendation.

Fish Tissue Screening Values and Mercury Criterion

OEHHA Fish Contaminant Goal:

OEHHA developed equations to determine Fish Contaminant Goals (FCGs) for the following pollutants: chlordane, DDTs, dieldrin, methylmercury, PCBs, selenium, and toxaphene (OEHHA, 2008). These equations are developed for chemicals that are carcinogens, non-carcinogens, or are considered non-carcinogenic nutrients. The FCG equations are:

- For a carcinogen,

$$\text{Tissue concentration (ppb)} = \frac{(\text{Risk Level})(\text{kg BW})(1000\mu\text{g}/\text{mg})}{[\text{CSF} (\text{mg}/\text{kg}/\text{day})^{-1}](\text{CR kg}/\text{day})(\text{ED}/\text{AT})(\text{CRF})}$$

- For a non-carcinogen,

$$\text{Tissue concentration (ppb)} = \frac{(\text{RfD mg}/\text{kg}-\text{day})(\text{kg BW})(1000\mu\text{g}/\text{mg})}{(\text{CR kg}/\text{day})(\text{CRF})}$$

- For a non-carcinogenic nutrient,

$$\text{Tissue concentration (ppb)} = \frac{[(\text{RfD mg}/\text{kg}-\text{day})(\text{kg BW}) - \text{mg}/\text{day Background Dietary Level}](1000\mu\text{g}/\text{mg})}{(\text{CR kg}/\text{day})}$$

where,

Risk Level = 1.0×10^{-6}

CSF = cancer slope factor (OEHHA, 2008; OEHHA, 2005; or U.S.EPA, 2000)

BW = Body Weight (consumer) = 70 kg

CR = consumption rate as daily amount of fish or shellfish consumed

CRF = cooking reduction factor (OEHHA uses 0.7 for organic contaminants, State Board uses 1)

ED/AT = exposure duration/averaging time (30 yr exposure/70 yr lifetime)

RfD = chemical specific reference dose (OEHHA, 2008 or U.S. EPA, 2000)

Background dietary level = 0.114 mg/day (applicable to selenium only)

Water Board staff used these equations (with modification) to calculate Fish Contaminant Goals (FCGs) for these and other contaminants in fish and shellfish tissue. The FCG equation was modified by changing the cooking reduction factor from 0.7 to one. A cooking reduction factor is a numeric value that represents the approximate amount of a contaminant that is removed from tissue by cooking. A cooking reduction factor of 1 implies that there is no net reduction in contaminant concentration from cooking. U.S. EPA guidance allows for the assumption of no contaminant loss during preparation and cooking (U.S. EPA, 2000).

Whole Organism and Fillet:

Tissue sample fractions were reported as either "whole organism" or "fish fillet." The OEHHA-modified FCGs were used for assessment of both whole organism and fish fillet data.

U.S. EPA Methylmercury Criterion:

The U.S. EPA criterion for methylmercury in tissue with a consumption rate of 32 g/day was used for assessment of methylmercury in tissue (OEHHA, 2008 and U.S. EPA, 2000). The assessed data results were primarily for mercury and not methylmercury. U.S. EPA guidance recommends that tissue be analyzed for total mercury with the assumption that most mercury in fish tissue is comprised of methylmercury (U.S. EPA, 2000).

Arsenic

Inorganic arsenic is the assessed pollutant. When results were reported as total arsenic, inorganic arsenic was calculated as 10% of the total arsenic result.

Polycyclic Aromatic Hydrocarbons:

Polycyclic aromatic hydrocarbons (PAHs) were assessed by comparing a potency-weighted total concentration of PAHs with the screening value for benzo(a)pyrene. The potency-weighted concentration was calculated for each PAH by multiplying the concentration of the PAH by a toxicity equivalency factor (TEF). The TEF is the toxicity of each PAH relative to benzo(a)pyrene. The potency-weighted concentrations for all PAHs were summed to create the potency-weighted total concentration for total PAH. The potency-weighted total concentration was then compared with the screening value for benzo(a)pyrene. The equation for the potency equivalency concentration is:

$$PEC = \Sigma (RP * C)$$

where,

PEC = Potency equivalency concentration
RP = Relative potency for the individual PAH
C = Concentration of the individual PAH

Shellfish Tissue

Reporting limits

Reporting limits for mussel watch shellfish results were not submitted with the data results. For this dataset, a minimum level was calculated based on the method detection limit. The minimum level is calculated as the method detection limit multiplied by 3.18 consistent with U.S. EPA guidance on assessment of detection and quantitation approaches (U.S. EPA, 2004).

Arsenic

Inorganic arsenic is the assessed pollutant. When results were reported as total arsenic, inorganic arsenic was calculated as 10% of the total arsenic result.

Water Matrix Analyses

Metals

The U.S. EPA 304(a) aquatic life criteria were calculated for the dissolved fraction of a metal in water. The dissolved fraction of the reported metal is most toxic to aquatic life, whereas the total fraction is considered in human health assessments. The data submitted for metals were sometimes reported as the total fraction and not the dissolved fraction. If the data were reported as the total fraction, then total criteria and not dissolved criteria were used for assessment. The assessment outcomes were the same whether using a total metal result or a dissolved metal result due to the use of the CTR conversion equations. In the future, metals assessment will be made for the dissolved fraction as that is the most bioavailable form of the pollutants.

Pyrethroids

Evaluation guidelines used for assessments include the UC Davis Aquatic Life Water Quality Criteria and the U.S. EPA Office of Pesticide Programs Pesticide Ecotoxicity Database. UC Davis recommends using the dissolved concentration of the pyrethroids with the UC Davis criteria; however, UC Davis does state that the use of whole water concentrations is also valid. Pyrethroid data were reported only as whole water concentrations and so assessments are for whole water concentrations. Conversion of whole water concentration to a dissolved concentration was not possible due to lack of information needed for the conversion.

Pesticide Evaluation Guidelines for Freshwater

Evaluation guidelines were taken from previous listing cycles and studies from the U.S. EPA Office of Pesticide Program Ecotoxicity Database. Studies selected from the Ecotoxicity Database were required to meet certain parameters for use as a guideline. The parameters focused on the quality and applicability of the study included the following:

- The study was classified as a Core² study
- The study was in freshwater
- Chemical > 80% pure
- Endpoint linked to survival, growth, or reproduction
- Species in a family that resides in North America
- Acceptable standard or equivalent method used
- Toxicity values calculated or calculable (i.e., LC50)
- Controls described (i.e., solvent, negative) and response reported meets acceptability requirements

The study that met the above parameters with the lowest toxicity value was selected as the guideline. If multiple studies for the same species and endpoint were available, the geometric mean was calculated and used as the guideline.

² A Core study is defined as: "All essential information was reported and the study was performed according to recommended EPA or ASTM methodology. Minor inconsistencies with standard recommended procedures may be apparent; however, the deviations do not detract from the study's soundness or intent. Studies within this category fulfill the basic requirements of current FIFRA guidelines and are acceptable for use in a risk assessment." (U.S. EPA, 2005b).

Indicator Bacteria Assessment Approach

The 2012 U.S. EPA Criteria for Recreational Water Quality was not finalized until November 26, 2012. The bacteria lines of evidence for water contact recreation (REC-1) had already been written using the 1986 U.S. EPA Ambient Water Quality Criteria for Bacteria, which were current at the time. The U.S. EPA 2012 criteria will be used to assess data collected as part of the next solicitation period.

For CWA section 303(d) listing purposes, bacterial data were assessed against the geometric mean criteria and the single sample maximum criteria. The Beaches Environmental Assessment and Coastal Health Act of 2000 recommends that the geometric mean (geomean) be calculated as a rolling average. State Board staff assessed bacterial data collected from marine and freshwater sources against the geometric mean objective in a rolling fashion if four or more data points per a 30 day period were available. Using four or more samples allows for more of the available data to be used because most bacteria samples are collected weekly and the rolling geomean looks at the steady state bacteria level.

Clarification for AB411

Section 3.3 of the Listing Policy states: “For bacterial measurements from coastal beaches, if water quality monitoring was conducted April 1 through October 31 **only**, a four percent exceedance percentage shall be used. For bacterial measurements from inland waters, if water quality monitoring data were collected April 1 through October 31 **only**, a four percent exceedance percentage shall be used if (1) bacterial measurements are indicative of human fecal matter, and (2) there is substantial human contact in the waterbody.” (Emphasis added.)

State Water Board staff interprets this to mean that all coastal beaches with data collected for only dry weather shall be evaluated based on a four percent exceedance frequency. This also holds true for inland surface waters. Water Board staff has discretion to determine if the waterbody in question satisfies caveats one and two listed in Section 3.3 above. If data are submitted for a time period that covers the entire year, then the associated LOE should be evaluated based on either a ten percent exceedance rate or a site-specific frequency.

During the 2014 and 2016 Listing Cycle, staff made a concerted effort to indicate when waterbodies were assessed using only dry weather data. Data that were assessed with different exceedance frequencies were evaluated independently to determine accurate use support ratings. Samples were not grouped unless they were applied to the same exceedance frequency.

Clarification for Data Assessed for the Shellfish Harvesting Beneficial Use (SHELL)

For marine waterbodies with the shellfish harvesting beneficial use, the total coliform objective in the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) states: “The median total coliform density shall not exceed 70 per 100 mL, and not more than 10 percent of the samples shall exceed 230 per 100 mL.” The State Board staff has applied the median 70 MPN/100 mL objective as a rolling geomean consistent with the implementation methodology outlined in the National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish (2011). In addition, a geomean captures the bacteria information consistent with the REC-1 objectives. The 230 MPN/100 mL was applied as a single sample maximum.

The Ocean Plan does not apply to enclosed bays, harbors, estuaries, and coastal lagoons. Applicable Basin Plan objectives were used for these waterbodies. This same implementation described above was utilized for the assessment of enclosed bays, harbors, estuaries, and coastal lagoons having the SHELL beneficial use when the Basin Plan uses a median value as an objective.

Toxicity Assessments

Water samples are usually tested for toxicity with multiple test species or matrices covering vertebrates, invertebrates, and plants. For toxicity assessments, one sample is defined as being of the same matrix from the same station on the same day. Each sample tested that has at least one species with a statistically significant difference from the control would be considered to have a toxic effect and thereby an exceedance. Each sample with an exceedance is counted once even if more than one species for that sample shows a significant difference. One LOE may summarize data that contains multiple tests and species-specific results, along with a record of the specific species that showed a significant difference.

The t-test statistical comparison method was used to determine if there was a statistically significant decrease in organism response in the sample as compared to the control. With SWAMP data, the statistical evaluation was completed and the sample was given a code to indicate if the test showed a significant effect. Initially during the 2014 and 2016 California Integrated Report process, SWAMP toxicity data was counted as an exceedance if the result had the Significantly Lower (SL) or the Significantly Greater (SG) result code. The SL code is defined as the result being significant compared to the negative control based on a statistical test, less than the stated alpha level, and less than the evaluation threshold. Whereas the SG code is defined as significantly different compared to the control but the sample response is higher than the threshold. In this case the response is unlikely to be biologically significant. Through discussions with the SWAMP Toxicity Work Group, Water Board staff determined, for 303(d) assessment purposes, only the SL code should be used to determine whether a sample is considered to have a toxic effect and thereby an exceedance. This approach was first employed during the 2012 Integrated Report and was continued for the 2014 and 2016 Integrated Report.

III. Development of 2014 and 2016 303(d) Listing Recommendations, Beneficial Use Support Ratings, and Integrated Report Categories

Listing recommendations and beneficial use support ratings are determined and developed in the CalWQA database. These recommendations are created by summarizing all relevant LOEs for a water segment pollutant combination and, based on the Listing Policy, determining if the number of exceedances warrants a listing. Potential sources are only identified in fact sheets when a specific source analysis has been performed as part of a TMDL or other regulatory process. Otherwise, the potential source is marked "Source Unknown."

A. 2014 and 2016 303(d) Listing Recommendations

Federal Listing Requirements

CWA section 303(d) requires states to identify waters that do not meet, or are not expected to meet, applicable water quality standards after the application of certain technology-based controls. The section 303(d) list must include a description of the pollutants causing the violation of water quality standards and a priority ranking of the water quality limited segments, taking into account the severity of the pollution and the uses to be made of the waters (40 C.F.R. § 130.7(b)(iii)(4)). As defined in CWA and federal regulations, water quality standards include the designated uses of a water segment, the adopted water quality criteria, and the State's Antidegradation Policy (State Water Resources Control Board (Resolution No. 68-16). Under State law (Porter-Cologne Water Quality Control Act, California Water Code § 13300 et seq.), water quality standards are beneficial uses of a water segment, the established WQOs (both narrative and numeric), and the State's Antidegradation Policy. Federal regulation defines a "water quality limited segment" as "any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after application of technology-based effluent limitations required by CWA sections 301(b) or 306" (40 C.F.R. § 130.2(j)). To restore water quality, a TMDL or other planning tool must be developed for water quality limited segments on the 303(d) List. A TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources, and natural background (40 C.F.R. § 130.2(j)).

State Listing Requirements

The Listing Policy identifies the process by which the State Water Board and Regional Water Boards comply with the listing requirements of CWA section 303(d). The objective of the Listing Policy is to establish a standardized approach for developing California's section 303(d) List with the overall goal of achieving water quality standards and maintaining beneficial uses in all of California's surface waters.

Provisions of the Listing Policy

The Listing Policy provides direction related to:

1. Definition of readily available data and information.
2. Administration of the listing process including data solicitation and fact sheet preparation.
3. Application and interpretation of chemical-specific water quality standards; bacterial water quality standards; health advisories; bioaccumulation of chemicals in aquatic life tissues; nuisance such as trash, odor, and foam; nutrients; water and sediment toxicity; adverse biological response; and degradation of aquatic life populations and communities.
4. Interpretation of narrative water quality objectives using numeric evaluation guidelines.
5. Data quality assessments including following an approved Quality Assurance Project Plan (QAPP).
6. Data quantity assessments including water segment specific information, data spatial and temporal representation, aggregation of data by reach/area, quantitation of chemical concentrations, evaluation of data consistent with the expression of water quality objectives or criteria, binomial model statistical evaluation, evaluation of bioassessment data, and evaluation of temperature data.
7. The use of a situation-specific weight of evidence approach when all other factors don't result in a listing or delisting where information suggests standards nonattainment or attainment, respectively.

California 303(d) List Structure

The Listing Policy requires that all waters that do not meet, or are not expected to meet, water quality standards be placed on the section 303(d) list. The Listing Policy describes the categories of water that shall be included on the California 303(d) List including:

(1) waters still requiring a TMDL, and (2) waters where the water quality limited segment is being addressed. Water segments in the “Water Quality Limited Segments Being Addressed” category must meet either of the following conditions:

1. A TMDL has been developed and approved by U.S. EPA and the approved implementation plan is expected to result in full attainment of the standard within a reasonable, specified time frame.
2. It has been determined that an existing regulatory program is reasonably expected to result in the attainment of the water quality standard within a reasonable, specified time frame.

For California, this means that waters in Integrated Report Categories 4a, 4b, and 5 comprise the California 303(d) List (see criteria of these categories in section III.B of this report).

Listing & Delisting Methodology

After reviewing the Regional Water Boards’ assessments, State Water Board staff determined whether or not the data demonstrated that the assessed waterbody was attaining water quality standards (i.e., whether the waterbody was impaired or not impaired). The determination for each waterbody-pollutant combination along with a presentation of the data assessment and the State Water Board staff recommended changes, when applicable, are documented in a fact sheet.

For a waterbody-pollutant combination that is not already listed on the 2012 303(d) List as impaired, staff made a recommendation to either list the waterbody-pollutant combination or not list it based upon the methodology specified in the Listing Policy.

For a waterbody-pollutant combination that is already listed on the 2012 303(d) List as impaired, staff made a recommendation to either keep the waterbody-pollutant combination on the list or delist it based upon the methodology specified in the Listing Policy.

Staff recommends listing or not delisting a water-body pollutant combination if adequate data exist to show that any of the following statements were true:

1. Numeric data exceed the numeric objective or evaluation guideline more than the prescribed number of times. The number of times varies by the number of samples and is based on a binomial distribution as described in the Listing Policy. See Sections 3.1, 3.2, 3.3, 3.5, 3.6, 4.1, 4.2, 4.3, 4.5, and 4.6 of the Listing Policy for more information.
2. A health advisory against the consumption of edible resident organisms or a shellfish harvest ban has been issued. See Section 3.4 of the Listing Policy for more information.
3. Nuisance conditions exist for odor, taste, excessive algae growth, foam, turbidity, oil, trash, litter, and color when compared to reference conditions. See Section 3.7 of the Listing Policy for more information.
4. Adverse biological response is measured in resident individuals as compared to referenced conditions and the impacts are associated with water or sediment concentrations of pollutants. See Section 3.8 of the Listing Policy for more information.
5. Significant degradation of biological populations and/or communities is exhibited as compared to reference sites. See Section 3.9 of the Listing Policy for more information.
6. A trend of declining water quality standards attainment is exhibited. See Section 3.10 of the Listing Policy for more information.

7. The weight of evidence demonstrates that a water quality standard is not attained. See Section 3.11 of the Listing Policy for more information.

Assumptions

In developing recommendations, staff assumed that:

1. The 2012 CWA section 303(d) List (Appendix J) would form the basis for the 2014 and 2016 303 (d) List submittal.
2. The provisions of the Listing Policy would direct staff recommendations.
3. Invasive species would be considered as pollutants and would be considered for inclusion on the section 303(d) list.
4. Water segment or pollutant listings are independent of the TMDLs that have been approved and are being implemented for a water segment. If a pollutant listing is removed from the list for any reason, that fact has no effect on the validity or requirements for implementing a TMDL that has been adopted and approved by U.S. EPA. Implementation of Basin Plan provisions is not affected by the section 303(d) list.
5. Provisions of Basin Plans, statewide plans, and other documents containing water quality standards were used as they are written. Judgments were not made during the list development process regarding the suitability, quality, or applicability of beneficial uses or water quality objectives.
6. Novel approaches for interpreting objectives were not used unless the approach was specifically allowed by the applicable water quality standards (e.g., analyzing wet and dry season data separately).

TMDL Scheduling

For water quality limited segments needing a TMDL or alternative planning tool, a completion schedule was developed by the Regional Water Boards (in compliance with federal law) based on the following Listing Policy provisions:

- a. Water segment significance (such as importance and extent of beneficial uses, threatened and endangered species concerns, and size of water segment);
- b. Degree that water quality objectives are not met or beneficial uses are not attained or threatened (such as the severity of the pollution or number of pollutants/stressors of concern) [40 C.F.R. § 130.7(b)(4)];
- c. Degree of impairment;
- d. Potential threat to human health and the environment;
- e. Water quality benefits of activities ongoing in the watershed;
- f. Potential for beneficial use protection and recovery;
- g. Degree of public concern;
- h. Availability of funding; and
- i. Availability of data and information to address the water quality problem.

The recommendation for TMDL completion is the target year for Regional Water Board adoption of the TMDL. In some circumstances, TMDLs have been adopted by Regional Water Boards in the past but the approvals from U.S. EPA are pending. In these cases, the water segment-pollutant combination will remain in the Water Quality Limited Segments category of the section 303(d) list (Category 5). For those TMDLs that have been developed and approved by U.S. EPA and the implementation plans have been approved, the water segment and pollutant was placed in the Water Quality Limited Segments Being Addressed category of the section 303(d) list (Category 4).

Additions, Deletions, and Changes to the 2012 303(d) List

This Staff Report shows the proposed changes to the 2012 303(d) List. Appendices A through G provide lists of waterbodies in each Integrated Report category of beneficial use support. The

rationale for the 303(d) listing/de-listing decisions for the Los Angeles region are documented in fact sheets in Appendix H. The rationale for all 303(d) listing/de-listing decisions statewide are documented in fact sheets in Appendix I. In addition to the changes discussed above and shown in the Staff Report, some waterbody segments' geographic delineations or names have been revised, as documented in the "Miscellaneous Changes" fact sheets in Appendix K. Appendix L provides citations for all of the references used in developing the 2014 and 2016 California Integrated Report.

Description of Staff Recommendations for 2014 and 2016 303(d) List:

In developing the 2014 and 2016 California Integrated Report section 303(d) List, Water Board staff reviewed and evaluated the water quality assessments and associated listing decision recommendations.

State Water Board staff reviewed the fact sheets that were prepared by the Regional Water Board staff in the CalWQA Database. These fact sheets were reviewed for consistency with the Listing Policy and to ensure the use of sound scientific judgment. State Water Board staff also evaluated statewide consistency. In addition to a general review of Regional Water Board fact sheets, there were timely requests for review submitted by stakeholders consistent with Section 6.2 of the Listing Policy. Timely requests for review are responded to as part of the written responses to comments. State Water Board staff is administering the complete listing process for all the 303(d) list recommendations in Region 4.

The fact sheets in Appendix I include the added or deleted water-pollutant combinations and State Water Board staff proposed changes. These changes are also summarized below and in Table 3:

San Francisco Bay Region (Region 2):

The San Francisco Bay Water Board recommended adding 24 waterbody-pollutant combinations and delisting 7 waterbody pollutant combinations from the 2012 California 303(d) List. The San Francisco Bay Water Board also re-segmented many of their waterbodies that resulted in several changes in scope of listings and delistings. State Water Board staff did not make changes to the San Francisco Water Board 303(d) List.

Central Coast Region (Region 3):

The Central Coast Water Board recommended adding 275 waterbody-pollutant combinations and delisting 47 waterbody pollutant combinations from the 2012 California 303(d) List. The Central Coast Water Board also re-segmented many of their waterbodies that resulted in several changes in scope of listings and delistings. State Water Board staff did not make changes to the Central Coast Water Board 2014 303(d) list.

State Water Board for the Los Angeles Region (Region 4):

The State Water Board recommends adding 153 waterbody-pollutant combinations and delisting 52 waterbody pollutant combinations from the 2012 California 303(d) List. The fact sheets and associated lines of evidence for the decisions are located in Appendix H.

Central Valley Region (Region 5):

The Central Valley Water Board recommended adding 269 waterbody-pollutant combinations and delisting 45 waterbody pollutant combinations from the 2012 California 303(d) List. State Water Board staff recommends making the following changes to the Central Valley Water Board 2014 303(d) List:

Multiple Waterbodies: Metals are incorporated into the definition of toxicants within the Listing Policy. Assessment of toxicants requires the use of Section 3.1. This change is necessary to ensure consistent statewide application of the Listing Policy. State Water Board staff reassessed the following waterbodies using Section 3.1 of the Listing Policy, which resulted in the following new listings:

1. Kentucky Creek (Nevada County) – Iron
2. Oregon Creek (Yuba and Sierra counties) – Iron
3. Scotchman Creek (Nevada County) – Iron
4. Spring Creek (Nevada County) – Iron
5. Yuba River, South Fork (Spaulding Reservoir to Englebright Reservoir) – Iron

Indicator Bacteria Listings in Stanislaus National Forest: State Water Board staff received two requests to review five listing recommendations approved by the Regional Water Board. State Water Board staff reviewed and reassessed the data and information used to support the listing recommendations and found that the data submitted does indicate impairment exists in four of the five waterbodies. However, the data submitted for Jawbone Creek, unnamed tributary (Tuolumne County), indicates that there is insufficient information to make a listing recommendation but that the impairment may be probable. Consequently, State Water Board staff recommends the following listing recommendations be marked as Do Not List based on insufficient information due to lack of samples, but the evidence does indicate that impairment may be probable (Category 3):

1. Jawbone Creek, unnamed tributary (Tuolumne County)

Santa Ana Region (Region 8):

The Santa Ana Water Board recommended adding 28 new waterbody-pollutant combinations and delisting 18 waterbody-pollutant combinations on the 2012 303(d) List. State Water Board staff recommends the following changes to the Santa Ana Water Board 2014 303(d) List:

Multiple Waterbodies: A use attainability analysis was approved by U.S.EPA that removed the REC-1 beneficial use from several waterbodies. However, those waterbodies were required to maintain the REC-2 beneficial use. Santa Ana Delhi Channel has a REC-2 antidegradation target of 1,104 cfu/100ml for concentrations of E.coli. State Water Board staff reassessed the following waterbody using the REC-2 target, which resulted in removing the following delisting:

1. Santa Ana Delhi Channel – Indicator Bacteria

Chino Creek Reach 1B (Mill Creek confl to start of concrete lined channel): State Water Board staff determined that it was inappropriate to delist this waterbody for chemical oxygen demand impairment without analyzing more recent data that supports the Regional Water Board staff assertion that the closing of the sewage treatment plant has changed the environment such that beneficial uses are no longer impaired. Therefore, State Water Board staff recommends maintaining this Listing until more recent data can be assessed.

Newport Bay: State Water Board staff re-assessed the lines of evidence written for chlorpyrifos in two locations of Newport Bay. The reassessment found that the data and information used to support delisting did not have the required QA/QC information to act

as primary evidence. Therefore staff is recommending removing the following delistings until data of higher quality can be assessed:

1. Newport Bay, Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido Channel to east end of H-J Moorings) – Chlorpyrifos
2. Newport Bay, Upper (Ecological Reserve) – Chlorpyrifos

Santa Ana River, Reach 3: State Water Board staff determined that the Regional Water Board staff recommendation for delisting the following waterbody-pollutant combinations were inappropriate and recommends keeping them on the 303(d) List based on the conversion equations promulgated within the California Toxics Rule:

1. Santa Ana River, Reach 3 – Copper
2. Santa Ana River, Reach 3 – Lead

San Diego (Region 9):

The San Diego Water Board recommended adding 243 new waterbody-pollutant combinations and delisting 17 waterbody-pollutant combinations on the 2012 303(d) List. State Water Board staff recommends the following changes to the San Diego Water Board 2014 303(d) list:

Prima Deshecha Creek: State Water Board staff determined that Section 3.1 of the Listing Policy was the appropriate assessment methodology for Selenium. This assessment resulted in the following new listing for this waterbody-pollutant combination:

1. Prima Deshecha Creek – Selenium

San Diego River (Lower): State Water Board staff determined that the MUN beneficial use does not apply to this waterbody. Manganese was re-assessed for support of aquatic life beneficial uses and State Water Board staff found that the waterbody should be delisted.

San Vicente Reservoir: State Water Board staff determined that it was inappropriate to delist this waterbody for Nitrogen and pH impairments without analyzing more recent data that supports the Regional Water Board staff assertion that the presence of the invasive Species Dreissenid “quagga” mussels has resulted in the removal of nutrients and any related impairments. Therefore, State Water Board staff recommends maintaining this Listing until more recent data can be assessed.

Sandia Creek: State Water Board staff determined that the use of Section 3.1 of the Listing Policy was appropriate for assessment of Aluminum. The assessment resulted in a new listing.

Table 3 Summary of State Water Board Staff Recommended Changes to Regional Water Board 303(d) Lists

| Region | Water Body | Pollutant | Regional Water Board Decision | State Water Board Recommendation |
|--------|--|------------------------|-------------------------------|----------------------------------|
| 5 | Kentucky Creek (Nevada County) | Iron | Do Not List | List |
| 5 | Oregon Creek (Yuba and Sierra counties) | Iron | Do Not List | List |
| 5 | Scotchman Creek (Nevada County) | Iron | Do Not List | List |
| 5 | Spring Creek (Nevada County) | Iron | Do Not List | List |
| 5 | Yuba River, South Fork (Spaulding Reservoir to Englebright Reservoir) | Iron | Do Not List | List |
| 5 | Jawbone Creek, unnamed tributary (Tuolumne County) | Indicator Bacteria | List | Do Not List |
| 8 | Santa Ana Delhi Channel | Indicator Bacteria | Delist | Do Not Delist |
| 8 | Chino Creek Reach 1B (Mill Creek confl to start of concrete lined channel: | Chemical Oxygen Demand | Delist | List |
| 8 | Newport Bay, Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido Channel to east end of H-J Moorings) | Chlorpyrifos | Delist | Do Not Delist |
| 8 | Newport Bay, Upper (Ecological Reserve) | Chlorpyrifos | Delist | Do Not Delist |
| 8 | Santa Ana River, Reach 3 | Copper | Delist | Do Not Delist |
| 8 | Santa Ana River, Reach 3 | Lead | Delist | Do Not Delist |
| 9 | Prima Deshecha Creek | Selenium | Do Not List | List |
| 9 | San Diego River (Lower) | Manganese | List | Delist |
| 9 | San Vicente Reservoir | Nitrogen | Delist | List |
| 9 | San Vicente Reservoir | pH | Delist | List |
| 9 | Sandia Creek | Aluminum | Do Not List | List |

The total State Water Board staff recommendations for the 2014 and 2016 303(d) List are summarized in Table 4. The last column includes the staff recommendation for the total 2014 and 2016 303(d) list including both the proposed and miscellaneous changes that were made for corrections.

Table 4 Total 2014/2016 303(d) Listing and Delisting Recommendations

| 2014 and 2016 CALIFORNIA INTEGRATED REPORT Summary Totals of Regional Board Approved 303(d) Listings and Delistings and State Water Board Recommended Revisions | | | | | | | | | | |
|---|---|---|-------------------|--|--|---------------------------|-----------------------------|------------------------------|-----------------------------|--|
| Region | 2012 303(d) List | 2014 and 2016 303(d) List | | | | | | | | |
| | Total 303(d) Listings (Categories 4a, 4b and 5) | Regional Boards Approved 303(d) Lists | | State Water Board Recommendations | | | | Miscellaneous Changes* | | Total 303(d) Listings (Categories 4a, 4b and 5) |
| | | New Listings | New Delistings | Removal of Regional Board New Listing | Removal of Regional Board New Delisting | New 303(d) Listings | New 303(d) Delistings | Resulting in Listings* | Resulting in Delistings* | |
| 1 | 185 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 185 |
| 2 | 333 | 24 | 7 | 0 | 0 | 0 | 0 | 6 | 10 | 350 |
| 3 | 712 | 275 | 47 | 0 | 0 | 0 | 0 | 0 | 24 | 940 |
| 4 | 823 | 0 | 0 | 0 | 0 | 150 | 57 | 0 | 0 | 916 |
| 5 | 730 | 269 | 45 | 1 | 0 | 5 | 0 | 0 | 0 | 958 |
| 6 | 156 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 156 |
| 7 | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 |
| 8 | 132 | 28 | 18 | 0 | 6 | 0 | 0 | 0 | 0 | 148 |
| 9 | 445 | 243 | 17 | 0 | 2 | 2 | 1 | 1 | 0 | 674 |
| TOTALS | 3,584 | 839 | 134 | 1 | 8 | 157 | 58 | 7 | 34 | 4,395 |

* Additional listings and delistings can be an artifact created from mapping changes such as the splitting of a waterbody into additional segments or the merging of waterbodies into one single waterbody. Original 303(d) listings are copied from old segments to new segments and then delisted from the old segment. This generates more listings and delistings that should not be included in important counts of 2014 and 2016 new listings and delistings

B. 2014 and 2016 Integrated Report Category and Beneficial Use Support Rating Determination

The 2014 and 2016 California Integrated Report places each California assessed water segment into one of five non-overlapping categories based on the overall beneficial use support of the water segment. These categories, described below, are based on the U.S. EPA guidance for States' Integrated Reports with recent modifications based on the Listing Policy and the need to accurately represent waterbodies that support assessed beneficial uses (U.S. EPA, 2005a). The modifications made after the 2012 listing cycle are presented in underline and strikeout formatting below.

| Category | Definition |
|-----------------------|---|
| 1 | <u>All assessed beneficial uses supported and no beneficial uses known to be impaired.</u> all core beneficial uses are supported |
| <u>2</u> 3 | There is insufficient information to determine beneficial use support. |
| <u>3</u> 2 | <u>There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened.</u> at least one core beneficial use is supported and none are known to be impaired. |
| 4 | At least one beneficial use is not supported but a TMDL is not needed. |
| 4a | A TMDL has been developed and approved by U.S.EPA for any waterbody-pollutant combination and the approved implementation plan is expected to result in full attainment of the water quality standard within a reasonable, specified time frame. |
| 4b | Another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified time frame. |
| 4c | The non-attainment of any applicable water quality standard for the waterbody segment is the result of pollution and is not caused by a pollutant. |
| 5 | At least one beneficial use is not supported and a TMDL is needed. TMDL requirement status is defined in our database as follows: 5A = TMDL still required, 5B = being addressed by U.S.EPA approved TMDL, and 5C = being addressed by action other than a TMDL. These are not separate categories. |

The categories were refined in order to identify and protect waterbodies that support designated beneficial uses in accordance with the U.S. EPA's Long Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program (U.S. EPA, 2013).

Water Board staff assesses waterbody - pollutant combinations based on the most protective beneficial use rather than for each designated "core" beneficial use. If a waterbody is meeting the pollutant criteria for protection of the most sensitive beneficial use(s), then that same waterbody is assumed to meet the less stringent criteria for the protection of the other

designated core beneficial uses. That assessment process allows for a more efficient use of staff resources, but inadvertently resulted in no waterbodies in California being placed into the previous definition of Category 1 because staff does not access all core beneficial uses where the most sensitive use is supported. The lack of Category 1 waterbodies inaccurately represented California's overall water quality by giving the impression that California has no waters that support all designated beneficial uses, when in fact over 400 waterbodies are supporting the most sensitive designated beneficial use.

The change in the definition of Category 1 allowed for the inclusion of the minimally disturbed data "reference sites" that were identified in the development of the California Stream Condition Index (CSCI) to be placed into Category 1. Reference sites are the core of California's biological and habitat assessment program and set the benchmark for biological conditions expected when human activity in the landscape is absent or minimal. Hundreds of waterbodies around the State passed several screening criteria and were identified as reference waterbodies for the purposes of developing the CSCI. The CSCI is a biological scoring tool that helps aquatic resource managers translate complex data about benthic macroinvertebrates found living in a stream into an overall measure of stream health. The CSCI score is calculated by comparing the expected condition with actual (observed) results. CSCI scores range from 0 (highly degraded) to greater than 1 (equivalent to reference). CSCI scoring of biological condition are as follows: ≥ 0.92 = likely intact condition, 0.91 to 0.80 = possibly altered condition, 0.79 to 0.63 = likely altered condition, ≤ 0.62 = very likely altered condition (Rehn, A.C., R.D. Mazor and P.R. Ode, 2015).

The CSCI is an improvement over the previously developed Regional Indices of Biological Integrity (IBIs) as it is applicable statewide, accounts for a much wider range of natural variability, and provides equivalent scoring thresholds in all regions of the state. During this cycle, some data were assessed using the Regional IBIs as the CSCI was not yet available during the time when some of the data were assessed. The CSCI will be used in the future for water quality assessment purposes statewide over the regional indices of biologic integrity (IBIs).

Table 5 lists the reference waterbodies (along with waterbodies with bioassessment data showing a CSCI score of 0.92 or higher) placed into Category 1 during the 2014 and 2016 Integrated Report cycle.

Table 5 CSCI Reference Sites added to Integrated Report Category 1

| Water Body Name | Waterbody ID | Region |
|---|---------------------------|---------------|
| Morses Gulch Creek | CAR2013001220080624164407 | 2 |
| Ritchie Creek | CAR2065002020110629213026 | 2 |
| Alamo Pintado Creek | CAR3144003119990222112600 | 3 |
| Coche Creek | CAR3145106020160721053459 | 3 |
| Coon Creek | CAR3102501019990225101818 | 3 |
| Laguna Creek (San Benito County) | CAR3055001520080604165438 | 3 |
| Little Sur River | CAR3080002319980825130201 | 3 |
| Lopez Canyon Creek | CAR3103101020160721054466 | 3 |
| Manzana Creek | CAR3122003020160721055032 | 3 |
| Nacimiento River (above Nacimiento Reservoir) | CAR3098117520020124115513 | 3 |
| Prewitt Creek | CAR3080006120080605165849 | 3 |
| Rattlesnake Canyon Creek | CAR3123001020160721052831 | 3 |

| | | |
|---|---------------------------|---|
| San Antonio River (above San Antonio Reservoir) | CAR3098122820020124134039 | 3 |
| Sisquoc River | CAR3121003020020124144528 | 3 |
| Soberanes Creek | CAR3080001220080605154816 | 3 |
| Swanson Canyon Creek | CAR3052001020020124150137 | 3 |
| Tassajara Creek | CAR3096003020160721051756 | 3 |
| Waddell Creek (Santa Cruz) | CAR3041101120020124153134 | 3 |
| West Fork Santa Cruz Creek, unnamed tributary | CAR3145106020160721055202 | 3 |
| Willow Creek (tributary to Tassajara Creek) | CAR3096003020160721053730 | 3 |
| Agua Blanca Creek and its tributaries (above Lake Piru) | CAR4034200020170117050177 | 4 |
| Bear Canyon and its tributaries | CAR4123200020170113027536 | 4 |
| Bear Creek and its tributaries | CAR4054300020170117051076 | 4 |
| Lion Canyon and its tributaries | CAR4033202020170117052626 | 4 |
| North Fork San Gabriel River and its Tributaries | CAR4054300020170113026996 | 4 |
| Piedra Blanca Creek and it's Tributaries | CAR4033202020170117048580 | 4 |
| Piedra Blanca Creek and it's Tributaries | CAR4033202020170117048580 | 4 |
| Santa Paula Creek and it's Tributaries | CAR4032100020170117043821 | 4 |
| Sisar Creek and its Tributaries | CAR4032200020170117042528 | 4 |
| Southern Tributary to Sespe Creek (Between Potrero John Creek and Munson Creek) | CAR4033202020170117041782 | 4 |
| Susanna Canyon and East Fork Susanna Canyon | CAR4054300020170113027642 | 4 |
| Thacher Creek and its Tributaries | CAR4023200020170117041255 | 4 |
| Tributary to East Fork San Gabriel River | CAR4054300020170113026904 | 4 |
| Tributary to Lockwood Creek | CAR4034200020170118029140 | 4 |
| Tributary to North Fork Matilija Creek | CAR4022001020170118032882 | 4 |
| Tributary to South Fork Santa Clara River | CAR4035100020170113025765 | 4 |
| Upper North Fork Matilija Creek and its tributaries | CAR4022001020170117041050 | 4 |
| West Fork Coyote Creek and its Tributaries | CAR4022003020170117041477 | 4 |
| West Fork San Gabriel River and its Tributaries | CAR4054300020170113027358 | 4 |
| Dye Creek | CAR5096201120110811032520 | 5 |
| Antelope Creek, South Fork | CAR5096302220110815224425 | 5 |
| Oregon Creek (Yuba and Sierra Counties) | CAR5174101220110209095856 | 5 |
| Jamison Creek (Plumas County) | CAR5183304020090114083509 | 5 |
| Mill River (Modoc County) | CAR5265302420090108164326 | 5 |
| Lincoln Creek (Sierra County) | CAR5175401020110820072319 | 5 |
| Sulphur Creek (Plumas and Sierra Counties) | CAR5183302120090108162726 | 5 |
| Jamison Creek (Plumas County) | CAR5183304020090114083509 | 5 |
| Grizzly Creek (Plumas County) | CAR5184204020110815230307 | 5 |
| Rice Creek, North Arm | CAR5184401020110814223846 | 5 |
| Indian Creek (headwaters to Antelope Lake, Plumas County) | CAR5185304420020502151300 | 5 |
| Fitzhugh Creek, Lower (Modoc County) | CAR5265204220090113145748 | 5 |
| Lassen Creek (Modoc County) | CAR5271002120101024215504 | 5 |
| Tuolumne River, South Fork | CAR5368002120110814223454 | 5 |

| | | |
|--|---------------------------|---|
| Grizzly Creek (Madera County) | CAR5374001320110815230706 | 5 |
| Bishop Creek (Mariposa County) | CAR5374004320110815001928 | 5 |
| Tenaya Creek | CAR5376003120110814220649 | 5 |
| Nelder Creek (Madera County) | CAR5393101120090105144343 | 5 |
| Mill Flat Creek | CAR5523416720110820071513 | 5 |
| Kings River, South Fork (Woods Creek to Bubbs Creek) | CAR5523422020110820072657 | 5 |
| Kaweah River, Middle Fork (Confl w Kaweah River East Fork to Dome Creek) | CAR5534302320050608154640 | 5 |
| Bear Creek (Tulare County) | CAR5551202020110815004208 | 5 |
| Deer Creek (San Bernadino County) | CAR8017200020110720154721 | 8 |
| Barton Creek, East Fork | CAR8017200020110808234451 | 8 |
| Plunge Creek | CAR8015200020170124048001 | 8 |
| Barton Creek | CAR8017200020110808235243 | 8 |
| Lytle Creek, Middle Fork | CAR8014100020110808233846 | 8 |
| South Fork Santa Ana River | CAR8017200020170124048397 | 8 |
| Fuller Mill Creek (Riverside County) | CAR8022100020110720160726 | 8 |
| Herkey Creek | CAR8022200020110809101415 | 8 |
| Strawberry Creek (San Bernardino County) | CAR8015200020111230144506 | 8 |
| Mill Creek Reach 2 | CAR8015800019990211110827 | 8 |
| Tributary to Santiago Creek, Reach 1 | CAR8011200020170124048623 | 8 |
| Lytle Creek, Middle Fork | CAR8014100020110808233846 | 8 |
| Kitchen Creek | CAR9116000020011025105327 | 9 |
| Wilson Creek (San Diego County) | CAR9113000020090204021246 | 9 |
| Pine Valley Creek (Lower) | CAR9113000020110816114851 | 9 |
| Pine Valley Creek (Lower) | CAR9113000020110816114851 | 9 |
| Indian Creek (San Diego County) | CAR9114100020110828154029 | 9 |
| San Diego River (Upper) | CAR9073100020011025102439 | 9 |
| Fry Creek | CAR9033100020081223081859 | 9 |
| Roblar Creek | CAR9022100020081223075955 | 9 |

Beneficial Use Support Rating Determination

Beneficial use support ratings are the basis for determining the Integrated Report category for each water segment assessed. Three possible beneficial use support ratings are used in California's 2014 and 2016 Integrated Report. They are Fully Supporting, Not Supporting, and Insufficient Information. These are the standard use support ratings designed by U.S. EPA for the Integrated Report.

The steps that ultimately lead to determining an overall use support rating for a water segment are described below and in Table 5. An example is portrayed in Figure 1 as well.

Step 1: Regional Water Board staff determines the number of exceedances of each pollutant in a monitoring dataset LOE, by comparing pollutant levels to applicable WQO, WQC, or evaluation guidelines.

Step 2: Regional Water Board staff then collects all LOEs for each pollutant assessed for the water segment and determines, based on the Listing Policy, whether or not the number of exceedances constitute a 303(d) listing, no listing, delisting, or no delisting.

Step 3: Regional Water Board staff then determines use support ratings based on the findings in Step 2. In general, most of the Regional Water Board staff used the following approach in determining use support ratings when assessing monitoring data:

- The use is supported if, based on the Listing Policy, pollutants do not exceed standards with a frequency that cause a 303(d) listing.
- The use is not supported if, based on the Listing Policy, pollutants exceed standards with a frequency that cause a 303(d) listing.
- Use ratings of “Insufficient Information” are given when it cannot be determined if a use is supported or not supported. This usually occurs when, based on the Listing Policy, the data have poor quality assurance; there are not enough samples in a dataset; there are no existing numerical criteria, objective, or evaluation guideline; or the information alone cannot support an assessment.

State Water Board staff encouraged the Regional Boards to employ an extra condition used in the 2012 Listing Cycle in determining whether a beneficial use is "supported." This condition is that a monitoring dataset must also consist of at least 26 samples for conventional pollutants, and at least 16 samples for toxic pollutants, before a use could be called “supported.” The sample size condition was derived from the number of samples required in the Listing Policy to run the binomial test, which is used to calculate the number of exceedances per sample size that would cause a 303(d) listing.

Step 4: The CalWQA database applies a set of rules that deduce the use support rating of each water segment from the collection of LOEs. These rules are shown in Table 5.

Step 5: The CalWQA database applies the same rules in Table 6 to deduce a water segment’s overall use support rating from the collection of all individual use support ratings.

Figure 1 is an example of how beneficial use support ratings can be deduced for individual uses of a water segment, and how individual use support ratings can be used to deduce one overall use support rating for the water segment.

Figure 1 Example of Determining Individual and Overall Beneficial Use Support Ratings for One Water Segment

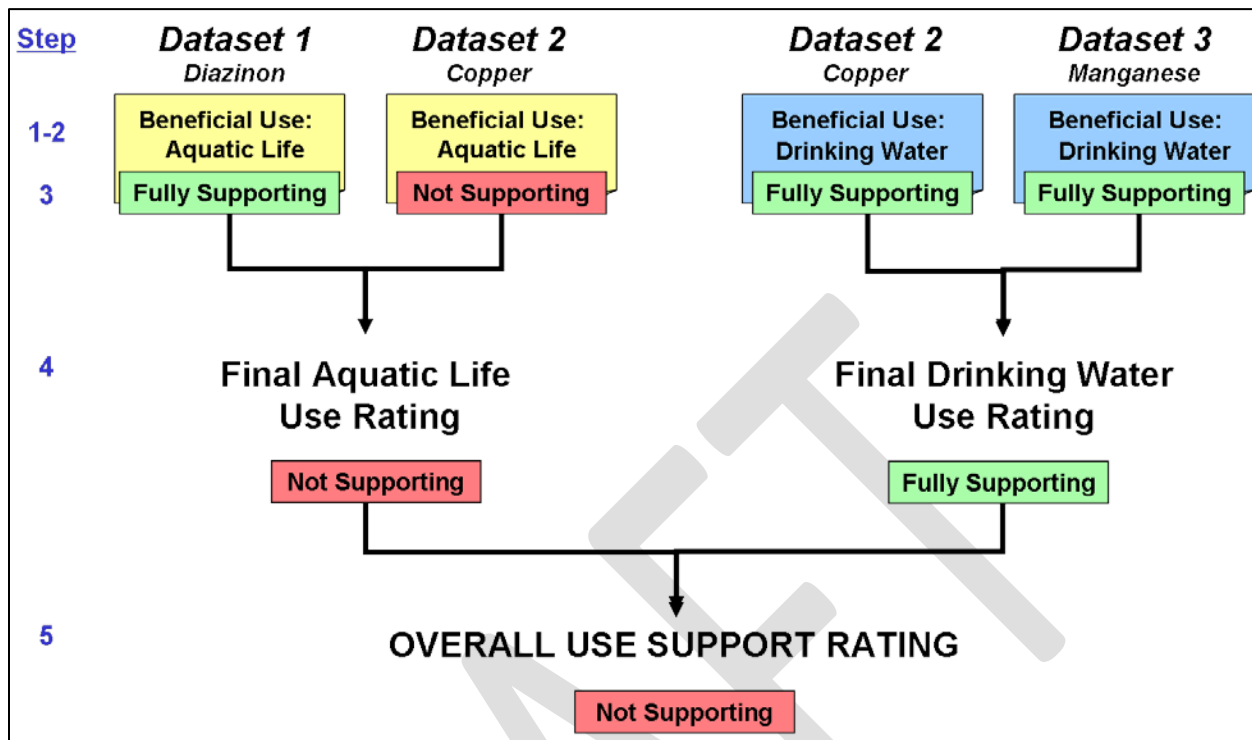


Table 6 Rules for Deducing Final Beneficial Use Support Ratings

| RATING 1 | | RATING 2 | | FINAL RATING |
|--------------------------|---|--------------------------|---|--------------------------|
| Fully Supporting | + | Fully Supporting | → | FULLY SUPPORTING |
| Fully Supporting | + | Not Supporting | → | NOT SUPPORTING |
| Fully Supporting | + | Insufficient Information | → | FULLY SUPPORTING |
| Not Supporting | + | Insufficient Information | → | NOT SUPPORTING |
| Not Supporting | + | Not Supporting | → | NOT SUPPORTING |
| Insufficient Information | + | Insufficient Information | → | INSUFFICIENT INFORMATION |

Public Review and Board Approval

Categories 1, 2, 3, and 4c are informational and do not require State Water Board approval. They will be submitted as part of the 2014 and 2016 California Integrated Report to the U.S. EPA for their biennial report to Congress. Categories 4a, 4b, and 5 are what California considers the Section 303(d) List of Impaired Waters. This 303(d) List of Impaired waters was reviewed by the public and is required to be approved by the State Water Board. A Statewide Category 5 list will be submitted to the U.S. EPA for final approval. The U.S. EPA's 303(d) List of Impaired Waters consists only of Category 5 waterbodies.

Public Participation

On June 9, 2017, the State Water Board provided public notice of a public hearing and public comment on the Draft 303(d) List portion of the 2014 and 2016 California Integrated Report. State Water Board staff provided written responses to comments.

IV. Information Management

California Water Quality Assessment (CalWQA) Database

All data LOEs, listing decisions/determinations, and beneficial use support ratings for assessed California waterbodies are stored in the Water Boards' CalWQA database. This database was developed in 2007 for the purpose of storing detailed water quality assessment information. The database is designed so that this information can be exported to the U.S. EPA's Assessment Database at the end of each assessment cycle.

References

Data and information used in LOEs come from a variety of sources. References are included to help track the sources from which the data and information summarized in the LOEs were derived. Copies of referenced documents are included as part of the administrative record.

Administrative Record

The administrative record contains all records used to develop the 2014 and 2016 California Integrated Report. Records are any documents produced, received, owned, or used by the Water Boards regardless of media, physical form, or characteristics. An index of the references is presented in Appendix L of this Staff Report.

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